

ORIGINAL

ANN BAVENDER\*  
KAREN L. CASSER\*  
ANNE GOODWIN CRUMP\*  
VINCENT J. CURTIS, JR.  
RICHARD J. ESTEVEZ  
PAUL J. FELDMAN\*  
ERIC FISHMAN\*  
RICHARD HILDRETH  
FRANK R. JAZZO  
ANDREW S. KERSTING\*  
KATHRYN A. KLEIMAN  
EUGENE M. LAWSON, JR.  
HARRY C. MARTIN  
GEORGE PETRUTSAS  
LEONARD R. RAISH  
JAMES P. RILEY  
KATHLEEN VICTORY\*  
HOWARD M. WEISS

\* NOT ADMITTED IN VIRGINIA

FLETCHER, HEALD & HILDRETH, P.L.C.

ATTORNEYS AT LAW

11th FLOOR, 1300 NORTH 17th STREET  
ROSSLYN, VIRGINIA 22209-3801

(703) 812-0400

TELECOPIES

(703) 812-0486

INTERNET

FLETCHERHEALD@msn.com

RECEIVED

JUL 15 1996

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

FRANK U. FLETCHER  
(1939-1985)  
ROBERT L. HEALD  
(1956-1983)  
PAUL D. SPEARMAN  
(1936-1981)  
FRANK H. HILDRETH  
(1936-1981)  
RUSSELL ROWELL  
(1948-1977)

RETIRED  
EDWARD F. KENEHAN

CONSULTANT FOR INTERNATIONAL AND  
INTERGOVERNMENTAL AFFAIRS  
SHELDON J. KRYS  
U. S. AMBASSADOR (1981)

OF COUNSEL  
EDWARD A. CAINE\*

WRITER'S NUMBER  
(703) 0470

July 15, 1996

**BY HAND DELIVERY**

Mr. William F. Caton  
Acting Secretary  
Federal Communications Commission  
1919 M Street, NW, Room 222  
Washington, DC 20554

Re: NII/SUPERNet  
ET Docket No. 96-102  
RM-8648/RM-8653  
Comments of 3Com Corporation

Dear Mr. Caton:

Transmitted herewith, on behalf of 3Com Corporation, are an original and nine (9) copies of its Comments in the above-referenced proceeding.

Should any questions arise concerning this matter, please communicate directly with this office.

Very truly yours,

FLETCHER, HEALD & HILDRETH, P.L.C.

  
Frank R. Jazzo  
Counsel for 3Com Corporation

FRJ/mm  
Enclosures

No. of Copies rec'd  
List A B C D E

079

BEFORE THE  
**Federal Communications Commission**

WASHINGTON, D.C. 20554

**RECEIVED**  
**JUL 15 1996**

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

**DOCKET FILE COPY ORIGINAL**

In the Matter of )

Amendment of the Commission's Rules to )  
Provide for Unlicensed NII/SUPERNet )  
Operations in the 5 GHz Frequency Range )

ET Docket No. 96-102  
RM-8648  
RM-8653

To: The Commission

**COMMENTS OF 3COM CORPORATION**

Frank R. Jazzo  
Kathryn A. Kleiman  
FLETCHER, HEALD & HILDRETH, P.L.C.  
1300 North 17th Street, 11th Floor  
Rosslyn, Virginia 22209  
(703) 812-0400

Its Attorneys

July 15, 1996

## **TABLE OF CONTENTS**

	<b>PAGE</b>
SUMMARY .....	i
I. Introduction .....	1
II. The Commission's Authorization of 350 Megahertz of spectrum for NII/SUPERNet applications provides much-needed bandwidth for innovative NII/SUPERNet devices and unnecessary technical regulations should not be imposed which would limit development .....	1
A. In its proposed regulations, the Commission sets out minimum technical regulations which will foster maximum innovation and creativity in the NII/SUPERNet spectrum .....	2
B. The Commission should stay true to its larger vision for Part 15: Providing minimum technical restrictions with maximum innovative opportunity. ....	3
C. Accordingly, WINForum's proposal for maximum channel bandwidth should be rejected as untimely and unduly restrictive of future development. ....	4
D. Minimum modulation efficiency should not be imposed at this time. ....	5
III. 3Com objects to the imposition of any additional spectrum etiquette standards, including the standard which will be developed in the future by WINForum, but supports the development of any voluntary standards that may be forthcoming. .	7
A. Voluntary spectrum etiquette standards will result in the best technology being developed, tested and used. ....	8
B. 3Com seeks clarification from the Commission that WINForum's future communications protocol will not be imposed as a mandatory standard on the entire NII/SUPERNet industry. ....	8
C. Reviewing the "Spectrum Etiquette" regulations of Section 15.411 may be an excellent first project for WINForum or other industry group. ....	10
IV. Evaluation of Apple's Community Networks proposal belongs in another proceeding. ....	10
V. Conclusion .....	11

## **SUMMARY**

Herein, 3Com Corporation ("3Com"), one of the world's largest data networking companies, with sales in the past year exceeding \$2.3 billion, submits these Comments in response to the *Notice of Proposed Rulemaking* ("NPRM"), FCC 96-193, released by the Commission on May 6, 1996. In these comments, 3Com urges the Commission to stay true to its vision of this NII/SUPERNet authorization by allowing innovation subject only to "minimum technical standards" and providing "significant flexibility in the design and operation of these devices." *NPRM*, para. 1. As discussed below, tomorrow's research and development of affordable, portable and easy-to-use tools for accessing the Internet and other networks should not be artificially constrained by unnecessary technical limits today.

3Com opposes WINForum's proposal for a maximum channel bandwidth specification. It should be rejected as untimely and unduly restrictive of future development. A minimum modulation efficiency of 1 bps/Hz should not be adopted at this time.

3Com objects to the imposition of any additional spectrum etiquette standards, including the standard which will be developed in the future by WINForum, but supports the development of any voluntary standards that may be forthcoming. Voluntary spectrum etiquette standards will result in the best technology being developed, tested and used. WINForum's future communications protocol should not be imposed as a mandatory standard on the entire NII/SUPERNet industry. Apple's community networks proposal should not be considered in this proceeding.

In conclusion, 3Com applauds the Commission for proposing minimum technical requirements for the Unlicensed NII/SUPERNet Devices proposed to be governed by the new Section E of Part 15 and urges the Commission to decline adoption of any further technical requirements.

BEFORE THE

**Federal Communications Commission**

WASHINGTON, D.C. 20554

RECEIVED

JUL 15 1996

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF SECRETARY

In the Matter of )  
 )  
Amendment of the Commission's Rules to ) ET Docket No. 96-102  
Provide for Unlicensed NII/SUPERNet ) RM-8648  
Operations in the 5 GHz Frequency Range ) RM-8653  
 )  
To: The Commission

**COMMENTS OF 3COM CORPORATION**

I. INTRODUCTION

3Com Corporation ("3Com"), by its attorneys and pursuant to Section 1.415 of the Rules of the Federal Communications Commission ("FCC" or "Commission"), hereby submits these Comments in response to the *Notice of Proposed Rulemaking* ("NPRM"), FCC 96-193, released by the Commission on May 6, 1996. As one of the world's largest data networking companies, with sales in the past year exceeding \$2.3 billion, 3Com is a leader in developing and manufacturing networking technologies that allow public and private networks to communicate. In these comments, 3Com urges the Commission to stay true to its vision of this NII/SUPERNet authorization by allowing innovation subject only to "minimum technical standards" and providing "significant flexibility in the design and operation of these devices." *NPRM*, para. 1. As discussed below, tomorrow's research and development of affordable, portable and easy-to-use tools for accessing the Internet and other networks should not be artificially constrained by unnecessary technical limits today.

II. THE COMMISSION'S AUTHORIZATION OF 350 MEGAHERTZ OF SPECTRUM FOR NII/SUPERNET APPLICATIONS PROVIDES MUCH-NEEDED BANDWIDTH FOR INNOVATIVE NII/SUPERNET DEVICES AND UNNECESSARY TECHNICAL REGULATIONS SHOULD NOT BE IMPOSED WHICH WOULD LIMIT DEVELOPMENT.

3Com applauds the Commission for its rapid response to the needs of schools, libraries, hospitals and homes by proposing to allow the operation of new unlicensed NII/SUPERNet devices in the 5.15-5.35 GHz and 5.725-5.875 GHz bands. As a developer of Wireless Local Area Network ("WLAN") technology in the 2.4 GHz band, 3Com welcomes the proposed new authorization as an opportunity to develop and explore wideband and narrowband equipment and applications which will provide access to the networks of today, and as the Commission has accurately described, to "other networks not yet built." *NPRM*, fn. 1.

A. IN ITS PROPOSED REGULATIONS, THE COMMISSION SETS OUT MINIMUM TECHNICAL REGULATIONS WHICH WILL FOSTER MAXIMUM INNOVATION AND CREATIVITY IN THE NII/SUPERNET SPECTRUM.

The Commission proposes in Section 15.407(a-c) general technical requirements for the new unlicensed NII/SUPERNet devices. These requirements will limit the maximum peak EIRP for the NII/SUPERNet transmitters, require an attenuation of 50 dB below the level of the fundamental emission and bar transmission when there is no data to transmit or there is a technical problem with the device. Such regulations are clearly essential for establishing a level playing field of transmission among NII/SUPERNet devices and preventing harmful and unnecessary interference.

The most important restriction is the limitation on the power of the NII/SUPERNet transmitter. While the higher power, longer distance community networks proposed by Apple raise separate questions which are discussed in Section IV below, many of the concerns about allowing a multiplicity of low power devices to share the NII/SUPERNet band are eliminated or significantly reduced because of the power limitations of these devices. Furthermore, the nature

of the 5 GHz spectrum in which these devices will be operating further reduces concerns because the noise and propagation characteristics limit the distance that the signals will travel.

In this era of increasing deregulation, 3Com agrees with the Commission that its role is to set out technical rules to prevent undue interference among unlicensed NII/SUPERNet devices without favoring any particular outcome or technology. Consistent with the approach taken in Sections A-C of Part 15 of its Rules, the Commission fosters the best technological developments in low power when it removes barriers to new development and allows a competitive market to decide what innovations will succeed and fail.

**B. THE COMMISSION SHOULD STAY TRUE TO ITS LARGER VISION FOR PART 15: PROVIDING MINIMUM TECHNICAL RESTRICTIONS WITH MAXIMUM INNOVATIVE OPPORTUNITY.**

The computing industry has been particularly fortunate in the farsighted rulemakings of the Commission. Initiated by the Office of Engineering and Technology ("OET"), often on its own motion, the past revisions to Part 15 of the FCC's Rules eliminated many regulations and opened new opportunities for the development of a wide and diverse array of low power devices. In 1989, the Commission removed regulations requiring individual licensing of low power devices, based on the philosophy that basic technical requirements would be sufficient to limit interference. According to the Commission, the changes were designed to "make every effort to remove all regulatory constraints that may unnecessarily impede the market from introducing new RF devices." *Report and Order, Revision of Part 15 of the Rules Regarding the Operation of Radio Frequency Devices Without an Individual License*, 4 FCC Rcd. 3493, 3495 (1989). In 1990, the Commission introduced the spread spectrum regulations, notably Sections 15.247 and 15.249, and opened to commercial use this military-developed technology. The Commission stated that its purpose was to "encourage the development and implementation of this exciting

new family of technologies." *Report and Order, Amendment of Parts 2 and 15 of the Rules With Regard to the Operation of Spread Spectrum Systems*, 5 FCC Rcd. 4123, 4124 (1990).

This broad vision has been rewarded by the truly spectacular growth of Part 15 devices and particularly the commercial spread spectrum technologies. Testimonial upon testimonial was presented to the Commission in 1994 about the exciting development taking place in the 2.4 GHz band during the *Allocation of Spectrum Below 5 GHz Transferred from Federal Government Use ("Below 5 GHz")* proceeding in which the Commission proposed to license 15 MHz of spectrum from the 2.4 GHz band used by Part 15 devices. *Notice of Proposed Rulemaking*, 9 FCC Rcd. 6779 (1994). The Commission learned that manufacturers, large and small, with radio frequency experience and without, had embraced the low power 2.4 GHz allocation and were developing a wide variety of applications, including WLANs. The Part 15 Coalition applauded the Commission for making the Part 15 bands truly "entrepreneurs' bands" in which low power development could flourish. *Comments of the Part 15 Coalition, Below 5 GHz*, submitted December 19, 1994, p. 6.

As the Commission proposes to further expand the spectrum in which Part 15 devices are authorized to operate, 3Com urges it to maintain the direction and entrepreneurial vision set forth in the proceedings above and to provide the broadest opportunity for innovation by not imposing additional technical restrictions on the NII/SUPERNET equipment.

C. ACCORDINGLY, WINFORUM'S PROPOSAL FOR MAXIMUM CHANNEL BANDWIDTH SHOULD BE REJECTED AS UNTIMELY AND UNDULY RESTRICTIVE OF FUTURE DEVELOPMENT.

3Com sees no reason to limit tomorrow's research and development because of our understanding of opportunities today. Networking technology, and particularly the applications which use the networking capabilities are changing at an explosive rate. Only five years ago, the



Internet was seen largely as text-based system whose file transfer and e-mail applications were used by professors, students, defense contractors and hackers. Today, the World Wide Web offers graphical interfaces to international information and online service providers are relentless in their search for new ways to package and present information and entertainment. Today, the cutting-edge applications are videoconferencing, realtime audio, voice and video, but only a soothsayer could tell you what tomorrow's innovations will offer.

With so many open questions about the future needs for wired and wireless networking capabilities, it seems premature and technically unwise to adopt a specific channeling plan or require a maximum channel bandwidth such as 25 MHz. If the spectrum was being allocated for licensed uses or being operated by higher power devices, such a restriction might be warranted, but the Commission is opening the new frontier for wideband and narrowband, multimedia and text-based, wireless low power devices. The 5 GHz band will become a testbed for the applications at the convergence of computer and communications technologies. Given the unknown development, why would we want to artificially limit maximum channel bandwidth today?

In answer to the Commission's concerns about unauthorized domination of the spectrum by a single user, 3Com finds that the characteristics of the spectrum, combined with the low power authorized for these devices, will create a practical maximum channel bandwidth on NII devices.

**D. MINIMUM MODULATION EFFICIENCY SHOULD NOT BE IMPOSED AT THIS TIME.**

Similar to the arguments set out above, it would be premature and unduly restrictive to new development for the Commission to impose the minimum modulation efficiency of 1 bps/Hz

proposed by WINForum on the unlicensed NII/SUPERNet devices. This technical requirement would increase the complexity of the system hardware and thereby increase the cost to the consumer as it would require a complex modulation scheme. Additionally, it will add to the development time. 3Com agrees with the Commission's desire to make the best possible use of the spectrum through efficient modulation techniques, however, when factoring in the added costs of meeting this specification, 3Com urges the Commission to consider alternatives that would allow manufacturers to make engineering system and product level tradeoffs to best meet the requirements of the varying customer demands.

The Commission is well aware of the many anticipated uses of the NII/SUPERNet allocation and the many expectations and needs that different groups are bringing to it. Paragraph 22 of the *NPRM* highlights the vision of the Atlanta Veteran's Administration Rehab R&D Center which supports the NII/SUPERNet authorization in hopes that devices will be developed to provide disabled individuals with wireless control of doors, lifts, pedestrian cross walk signals and elevators. *NPRM*, para. 22. The success of these systems will be determined, not by overall throughput and efficiency, but by the additional control and confidence that a simple, inexpensive device will provide to a disabled individual.

The Commission should also consider that the imposition of the minimum modulation efficiency proposed by WINForum of 1 bps/Hz would delay the introduction of many NII/SUPERNet devices. As the Commission knows, numerous companies are developing WLAN technologies in the 2.4 GHz band and, given this extensive development, these companies are likely to be among the first providers of NII/SUPERNet equipment. However, the proposed efficiency minimum is incompatible with many popular modulation schemes, such as the Gaussian Minimum Shift Keying ("GMSK"). Because the GMSK has a modulation

efficiency of 0.6 bps/Hz, it could not be employed under the proposed WINForum minimum and those companies seeking to offer products which use it would be forced to return to their labs for further reengineering and development. Congress, the NTIA and the public are eagerly anticipating the arrival of the NII/SUPERNet services and it seems inappropriate to delay such offerings by requiring compliance with an entirely new set of standards.

Therefore, in keeping with the Commission's goal of providing maximum flexibility for developers to provide new NII applications, there appears to be no reason to require a maximum channel bandwidth or a minimum modulation efficiency at this early stage of the NII/SUPERNet development.

III. 3COM OBJECTS TO THE IMPOSITION OF ANY ADDITIONAL SPECTRUM ETIQUETTE STANDARDS, INCLUDING THE STANDARD WHICH WILL BE DEVELOPED IN THE FUTURE BY WINFORUM, BUT SUPPORTS THE DEVELOPMENT OF ANY VOLUNTARY STANDARDS THAT MAY BE FORTHCOMING.

As discussed above, 3Com fully supports the decision of the Commission not to follow the lead of Europe in defining every aspect of the architecture and modulation of the new NII/SUPERNet devices. Europe's HiperLAN is an important, but narrow vision of wireless connection to networks and the Commission's proposals for Part 15 will create a different and much broader opportunity for American ingenuity and development.

To this end, 3Com asks that the Commission encourage the development of voluntary spectrum etiquette standards for interoperability, but not impose any additional mandatory spectrum standards now or in the future.

**A. VOLUNTARY SPECTRUM ETIQUETTE STANDARDS WILL RESULT IN THE BEST TECHNOLOGY BEING DEVELOPED, TESTED AND USED.**

3Com's extensive experience with communication protocols for networks clearly demonstrates that the most innovative solutions to ground breaking technical questions come, not from committees, but from small groups of engineers given the resources, time and goal of focusing and solving technical problems. There have been numerous examples of this process such as the origination of today's well-known Ethernet and Token Ring networking technologies.

By allowing a broad range of development and experimentation in the NII/SUPERNet spectrum, industry will have the incentive to devise the best wireless communications protocols and to introduce the broadest range of wireless NII products into the marketplace. Business and consumer users will then select those devices which provide the highest quality of transmission that best meet their needs. Industry groups can then meet to compare existing protocols and to debate the best way to implement interoperability standards. WINForum's idea of going straight to committee development appears to be putting the cart before the horse.

**B. 3COM SEEKS CLARIFICATION FROM THE COMMISSION THAT WINFORUM'S FUTURE COMMUNICATIONS PROTOCOL WILL NOT BE IMPOSED AS A MANDATORY STANDARD ON THE ENTIRE NII/SUPERNET INDUSTRY.**

Paragraph 52 of the *NPRM* poses some disturbing language for NII/SUPERNet manufacturers. Although the Commission introduces the "listen-before-talk" standard in proposed Section 15.411 and discusses its goal of broad flexibility for developers, it refers to the current spectrum etiquette as serving only "on an interim basis until an etiquette is developed by industry." *NPRM*, para. 52. This statement implies that the Commission is considering imposing the WINForum standard, once it is developed, as a mandatory standard for all NII/SUPERNet devices. 3Com believes that such a requirement would be a serious mistake and that uncertainty

on this point will undercut the quality of research and restrict the amount of investment which developers will risk in researching and developing NII/SUPERNet devices.

The Commission has already acknowledged that there will be a time delay in the development of an industry standard. *NPRM*, para. 52. We can reach the conclusion that the time delay will be significant by reference to the proceedings of the IEEE's 802 LAN MAN Standards Committee, a committee created to draft an interoperability standard for WLANs in the 2.4 GHz band. The development process of this Committee commenced six years ago and proceeds today without a final product.

In the NII/SUPERNet band, however, the Commission plans to allow manufacturers to develop and introduce NII/SUPERNet devices based on the minimum spectrum etiquette regulations of the proposed Section 15.411. The Commission also would allow modulation techniques and architectures that the manufacturers have developed themselves. When WINForum returns with its recommended standard, the Commission is suggesting that the regulations would be changed to make this standard mandatory; any NII/SUPERNet devices not complying with the standard would need to be pulled from the market. Sizable investments in research and development, manufacturing and marketing would be lost. Such uncertainty will not build business confidence in investing in the rapid development of the NII devices which Congress, NTIA and the American people are so eagerly awaiting.

By clearly stating that any interoperability standard proposed by WINForum, or any other organization, will be voluntary and not mandatory, the Commission will restore the confidence necessary to encourage rapid investment in the NII/SUPERNet concept.

3Com notes, as further support for its position, that interoperability is not necessarily a feature to be desired in all NII/SUPERNet systems. In fact, interoperability may become a

security concern for companies who would rather limit wireless access to a patient's medical history or a student's academic record to those physicians and teachers with equipment operating on a proprietary communications system.

C. REVIEWING THE "SPECTRUM ETIQUETTE" REGULATIONS OF SECTION 15.411 MAY BE AN EXCELLENT FIRST PROJECT FOR WINFORUM OR OTHER INDUSTRY GROUP.

3Com has reviewed the specific requirements of the "Spectrum Etiquette" standard set out in proposed Section 15.411 and questions the numerous time periods and technical requirements that it establishes. One such requirement, in Section 15.411(b), would allow for a maximum transmission length of no greater than 10 milliseconds. This limitation may, in fact, be detrimental to the Commission's goal of efficient use of the spectrum.

The inherently poor bit error rate of the 5 GHz radio medium is likely to result in large numbers of packet errors which would force packet retransmissions and lower the efficiency of the medium. Clearly, this outcome depends heavily on the data rate, modulation scheme, coding scheme and radio implementation chosen by the manufacturer. 3Com would welcome the opportunity to meet with other wireless developers to discuss the characteristics of the 5 GHz systems and to report back to the Commission about the group's recommendation. Additionally, other elements of the back off timing and deference window, while they are generous by today's standards, may potentially result in lower performance for future systems.

IV. EVALUATION OF APPLE'S COMMUNITY NETWORKS PROPOSAL BELONGS IN ANOTHER PROCEEDING.

While 3Com supports the overall goals of the Apple proposal to establish community networks, it believes that these high-power, longer distance networks are properly evaluated in the context of another proceeding. The purpose of this proceeding is to establish the technical

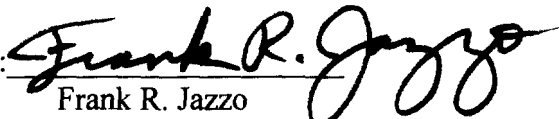
requirements under which a new class of low power Part 15 devices will operate in the 5 GHz band and Apple's community networks are not low power devices. 3Com shares the Commission's concerns that "such higher power operations would pose unacceptable interference risks to other services, such as fixed satellite in the 5.10-5.35 GHz band, and would greatly limit the number of unlicensed operations within a local area." *NPRM*, para. 47.

V. CONCLUSION

In conclusion, 3Com applauds the Commission for proposing minimum technical requirements for the Unlicensed NII/SUPERNet Devices proposed to be governed by the new Section E of Part 15 and urges the Commission to decline adoption of any further technical requirements.

Respectfully submitted,

3COM CORPORATION

By:   
Frank R. Jazzo

By:   
Kathryn A. Kleiman

Its Attorneys

FLETCHER, HEALD & HILDRETH, P.L.C.  
1300 North 17th Street, 11th Floor  
Rosslyn, Virginia 22209  
(703) 812-0400

July 15, 1996  
bll/frjK/3com.p